User's Manual

1067/1090/1021+ CCD Scanner

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WARNING

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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1. Introduction

This User's Manual contains all the information needed to operate and configure the 1067/1090/1021+ CCD Barcode Scanner. It is divided into two parts. The first part of this manual describes the operation and programmable features of the scanner. And the second part of this manual is used for configuration, it contains the setup barcodes used to configure the scanner.

The 1067/1090/1021+ is one of the most versatile and flexible CCD barcode scanner in the world. All the features and functions required for up to date barcode reading are included. Owing to the compact design and extremely low power consumption, this scanner provides for easy installation and high product durability. The scanner can not only fulfill the requirements needed today, but also can suffice for long term usage. The main functions and features provided on 1067/1090/1021+ are listed below.

- Barcode Readability : Most popular barcode symbologies are supported.
- Support negative barcodes.
- Support eight scan modes.
- Programmable Buzzer Volume and Beeping Tone
- Dual Color Indicator
- Multi-Interface Support : KBD Wedge, RS232 (Single/Dual Port), and Wand Emulation
- Programmable Code ID : Code ID can be individually configured for each symbology.
- Programmable Length Code
- Programmable Prefix Code
- Programmable Postfix Code
- Character Substitution
- Data Editing : Data can be reorganized according to user programmable formats. Up to three data editing formats are supported.
- Extremely Low Power Consumption

2. General Features

2.1 Buzzer

The buzzer of the scanner beeps differently to indicate various operating conditions.

- **Power On Beep** : The CCD scanner will issue a long beep to indicate a successful power on.
- **Good Read Beep** : There are four volume levels and four beeping tones (frequencies) that user can select from when there is a good read. The available options are listed below.

  Volume : Maximum/Loud/Medium/Minimum
  Frequency : 8 / 4 / 2 / 1 kHz

- **Error Beep** : The scanner will issue a long beep with a low tone to indicate errors.
- **Enter / Exit Configuration Beep** : The scanner will issue 6 beeps upon entering / exiting the configuration mode.
- **Setup Beep** : In configuration mode, the scanner will normally beep twice when a setup barcode is read. If the particular setup parameter needs more than one read, the scanner will only issue a short beep to indicate that there are more setup barcodes needed to complete the current parameter setting.

2.2 Indicator

There is a dual color indicator on top of the scanner. Normally it is off, and it will turn red when there is a good read. The indicator will be green when the scanner is in configuration mode.

2.3 Scan Modes

There are eight scan modes supported by the CCD scanner. User can choose the desired scan mode depending on the application requirements. But, if the scanner is a switch-less scanner, only Continuous mode or Testing mode can be selected (other scan modes involve trigger switch interaction). The supported scan modes are described below.

- **Auto Off Mode :** The scanner will start scanning once the switch is triggered. The scanning continues until either a barcode is read or a preset scanning period (*Scanner Time-Out Duration*) is expired.
- **Continuous Mode :** The scanner is always scanning.
- **Auto Power Off Mode :** The scanner will start scanning once the switch is triggered. The scanning continues until a preset scanning period (*Scanner Time-Out Duration*) is expired. Unlike the Auto Off mode, the scanner will continue to scan and the scanning period is re-counted each time there is a successful read.
- **Alternate Mode :** The scanner will start scanning once the switch is triggered. The scanner will continue scanning until the switch is triggered again.
- **Momentary Mode :** The scanner will be scanning as long as the switch is depressed.
- **Repeat Mode :** The scanner is always scanning just like Continuous Mode. But now the switch acts like a “re-transmit button”. If the switch is triggered within 1 second after a good read, the same data will be transmit again without actually reading the barcode. This “re-transmit button” can be triggered as many times as user desired, as long as the time between each triggering does not exceed 1 second. This scan mode is most useful when the same barcode is to be read many times.
- **Laser Mode :** This is the scan mode most often used on laser scanners. The scanner will start scanning once the switch is pressed. The scanning continues until either a barcode is read, the switch is released or a preset scanning period (*Scanner Time-Out Duration*) is expired.

- **Test Mode :** The scanner is always scanning. The scanner will decode repeatedly even with the same barcode.

By default, the scan mode is Auto Off mode for scanners with trigger switch, and is Continuous mode for switch-less scanners.

2.4 Inhibit Time

If the scanner mode is set to *Continuous*, *Auto Power Off*, *Alternate*, or *Momentary* mode, the scanner will prevent accidentally reading the same barcode twice by using an *Inhibit Time (Blocking Time)*. The barcode must be taken away from the scanning line longer than the *Inhibit Time* to allow second reading of the same barcode. This *Inhibit Time* can be long or short.

2.5 Scanner Time-out Duration

This parameter is used to limit the maximum scanning period when the scan mode is either *Auto Off Mode* or *Auto Power Off Mode*. This time-out duration is specified in units of second. The default time-out duration is ten seconds.

2.6 Reading Redundancy

This parameter is used to specify the levels of reading (decoding) security. If *No Redundancy* is selected, only one successful decoding can make the reading valid. If *Three Times Redundancy* is selected, it will take 3 successful decodes to make the reading valid. It is obvious that the more redundancy the user selects, the higher the reading security and thus the slower the reading speed. The user must compromise between decoding security and decoding speed if the security feature is needed.

2.7 Supported Symbologies

Most of the popular barcode symbologies are supported. Each symbology can be individually enabled or disabled. The scanner will automatically discriminate and recognize all the symbologies that are enabled. The supported barcode symbologies are listed below.

- Code 39 (Standard / Full ASCII)
- Italy Pharmacode
- French Pharmacode
- Industrial 25
- Interleave 25
- Matrix 25
- Codabar (NW-7)
- UPCA (with or without Addon)
- UPCE (with or without Addon)
- EAN8 (with or without Addon)
- EAN13 (with or without Addon)
- Code 93
- Code 128
- EAN 128
- MSI
- Plessey

2.8 Negative Barcodes

The CCD scanner can be configured to read negative barcodes. Normally, barcodes are printed with the color of the bars darker than that of the spaces. But for negative barcodes, they are printed in the opposite sense just like negative films. The spaces of the negative barcodes are printed with a color darker than that of the bars.

3. Output Interface

The 1067/1090/1021+ is a multi-interface CCD scanner. It can be configured as a keyboard wedge scanner, an RS-232 scanner, or a Wand emulation scanner. The output interface can be easily changed simply by replacing appropriate interface cable and configuring the desired interface type.

3.1 Keyboard Wedge Interface

3.1.1 Keyboard Type

The keyboard wedge interface is enabled by configuring/selecting keyboard type. The supported keyboard types are listed below.

- PCAT - US, French German, Italian, Swedish, Norwegian, UK, Belgium, Spanish, and Portuguese KBD
- PCXT
- PS2-30
- PS-55
- IBM 5550
- IBM 3477 TYPE (Japanese KBD)
- IBM 34XX,319X & Memorex Telex (122Keys)
- Wyse Enhance KBD (US, French)
- DEC VT220,320,420
- Macintosh (ADB)
- Hitachi Elles
- NEC 5200
- NEC 9800
- NEC Astra
- Unisys TO-300
- Televideo 965
- ADDS 1010

3.1.2 Keyboard Style - Alphabets

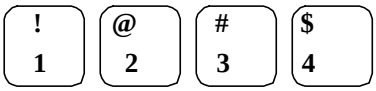
Keyboard layout style can be selected. There are three options to this setting : default layout (US or English style), AZERTY layout, and QWERTZ layout. This setting only works when the keyboard type selected is for US keyboard. The scanner will make necessary

adjustment when sending the ‘A’, ‘Q’, ‘W’, ‘Z’, ‘Y’, and ‘M’ character according to this setting.

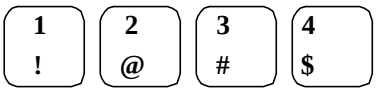
3.1.3 Keyboard Style – Digits

There are two digit layout styles as shown on the following figures. One has its digit keys on top (upper row), the other has them on bottom (lower row).

The digit layout style can be changed by configuring this setting. There are three options to this setting : **Default**, **Lower Row**, and **Upper Row**. The scanner will make necessary adjustment when sending digits according to the setting value of this parameter. This setting is meant to be used with the above setting (Keyboard Style – Alphabets) and perhaps Character Substitution setting, when support to languages not available on the scanner is needed.



Digits on Lower Row



Digits on Upper Row

3.1.4 Capital Lock Status

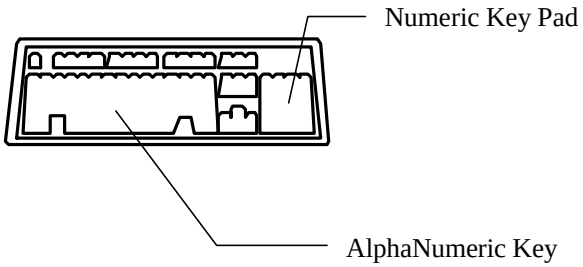
In order to send alphabets with correct case, the scanner needs to know the capital lock status of the keyboard. Incorrect settings may result in reversed case of alphabets being transmitted. There are 3 options to this parameter : *On*, *Off*, or *Auto Detection*. If this parameter is set to *Auto Detection*, the scanner will automatically detect the capital lock status of the keyboard before it transmits data. But the *Auto Detection* option is supported only when the keyboard type configured is either PCAT (all available languages), PS2-30, PS55, IBM 34XX/319X, or Memorex Telex.

3.1.5 Alphabets Transmission

User can choose how alphabets are sent by configuring this parameter. The alphabets can be sent according to their case (the *Case Sensitive* option), or the case is ignored (the *Ignore Case* option) when transmitting.

3.1.6 Digits Transmission

User can choose how the scanner transmits digits by configuring this parameter. The scanner can transmit digits by using the alphanumeric key or by using the numeric key pad. The Num Lock status of the keyboard should be ON if numeric key pad option is selected.



3.1.7 Inter-Character Delay

An inter-character delay of 0 to 255 ms can be configured to match the computer response time of the keyboard interface. The delay time configured is inserted between transmitting every character. The longer the delay time configured, the slower the transmission speed will be. The inter-character delay is zero by default.

3.2 RS232 Interface

The RS-232 interface is enabled by reading the "Activate RS-232 Interface" label in configuration mode. User can select the desired transmission mode, flow control, baud rate, parity, and data bits to be used in this output interface.

3.2.1 Transmission Mode

There are four transmission modes supported on the scanner when RS232 output interface is used. One of them is for single port operation, and the others are for dual port operation. Single port operation is used where the scanner is connected directly to the host computer, whereas the dual port operation is used where the scanner is connected between host and terminal. The interface cable for dual port operation always has two connectors, one of them is a male connector and the other one is a female connector. Under dual port operation, user can select whether data are transmitted to either ends or are transmitted to both ends. The supported transmission modes are listed below.

- Single Port
- Dual Port - Data are transmitted to male connector end.
- Dual Port - Data are transmitted to female connector end
- Dual Port - Data are transmitted to both ends.

3.2.2 Baud Rate / Parity / Data Bits

The supported baud rate, parity, and data bit are listed below.

- Baud Rate : 38400 / 19200 / 9600 / 4800 / 2400 / 1200 / 300 / 110
- Parity : None / Even / Odd
- Data bit : 8 / 7

3.2.3 Flow Control

If the single port transmission mode is selected, user can further configure the flow (handshake) control method to be used. The available options are listed below.

- No Flow Control
- Scanner Ready : The scanner will activate the RTS signal after power on. After each good read the scanner will then wait for the CTS signal becomes active. The data will not be sent until CTS signal becomes active.
- Data Ready : The RTS signal will be activated after each good read. The scanner will then wait for the CTS signal becomes active. The data will not be sent until CTS signal becomes active.
- Inverted Data Ready : It is like the *Data Ready* flow control, but the RTS signal level is inverted.

3.2.4 Inter-Character Delay

An inter-character delay of 0 to 255 ms can be configured to match the computer response time. The delay time configured is inserted between transmitting every character. The longer the delay time configured, the slower the transmission speed will be. The inter-character delay is zero by default.

3.3 Wand Emulation

The Wand Emulation output interface is enabled by reading the "Activate Wand Emulation" label in configuration mode. User can select the signal levels of the normal status and bar status to be used in this output interface.

3.3.1 Normal Status

This setting specifies the signal level of the normal state when not transmitting a barcode image.

3.3.2 Bar Status

This setting specifies the signal level used to represent a bar when transmitting a barcode image.

3.4 PC Term Mode

The PC Term mode is enabled by reading the "Activate PC Term" label in configuration mode. The user can select US style keyboard or French style keyboard depends on which activation label is read.

User can then select the desired baud rate, parity, and data bits to be used in this output interface. The Inter-Character Delay and Capital Lock Status settings can also be configured.

4. Symbology Parameters

This section describes user configurable parameters which are pertaining to barcode symbologies.

4.1 Code39

- **Standard / Full ASCII Code 39** : User can choose to read either Standard Code 39 or Full ASCII Code 39 by configuring this parameter.
- **Start/Stop Transmission** : This parameter specifies whether the start/stop characters of Code 39 are included in the data being transmitted.
- **Checksum Verification** : This parameter specifies whether the scanner will perform checksum verification when decoding barcodes. If the checksum is incorrect, the barcode will not be read.
- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.

4.2 Italy / French Pharmacode

For Italy /French Pharmacode, there is always a checksum character included in the barcode. So the checksum verification is always performed when decoding these symbologies. User though can choose whether the checksum character is to be transmitted or not. The start / stop transmission of this code shares the same setting of Code 39.

- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.

4.3 Industrial / Interleave / Matrix 25

- **Start / Stop Selection** : This parameter provides the readability of all 2 of 5 symbology variants. For example, flight tickets actually use an Industrial 25 barcode but with Interleave 25 start / stop. In order to read this barcode, the **start / stop selection** parameter of Industrial 25 should set to '**Interleave 25**.

- **Checksum Verification** : This parameter specifies whether the scanner will perform checksum verification when decoding barcodes. If the checksum is incorrect, the barcode will not be read.
- **Checksum Transmission** : This parameter specifies whether the checksum character are included in the data being transmitted.
- **Code Length Qualification** : Because of the weak structure of the 2 of 5 codes, a partial scan has a high probability of decoding as a valid but shorter 2 of 5 codes (known as short scan). To prevent this kind of undesired reading, the **Code Length** settings can help to insure that the correct code is read by qualifying the allowable code length. Code length parameters can be configured in two ways : **Fixed Code Length** or **Max / Min code length**. If the fixed code length is selected, up to 2 fixed lengths can be specified. And if max / min code length is selected, the max length and the min length must be specified, and the scanner will only accept those codes with lengths fall between max / min length specified.
- **Read Odd Number of Digits** : This parameter is available only to the Interleave 25. This parameter must be enabled in order to read Interleave 25 labels which contain odd number of digits.

4.4 Codabar

- **Start/Stop Transmission** : This parameter specifies whether the start/stop characters of Codabar are included in the data being transmitted.
- **Start / Stop Selection** : Four different start / stop pairs can be selected as start / stop characters as listed below.
  abcd / abcd
  abcd / tn*e
  ABCD / ABCD

ABCD / TN*E

- **CLSI Conversion** : If this parameter is enabled, the scanner will perform the CLSI conversion when a 14 digits Codabar barcode is read.

4.5 UPCE

- **System Number Selection** : The UPCE comes with 2 flavors : S**ystem Number 0** and S**ystem Number 1**. These two differ in the way data are encoded. The system number 1 is the new UPCE extension to the ordinary UPCE (system number 0). User can have the choice of enabling both system numbers or just system number 0.

Warning : Because of the way system number 1 is encoded, if both system numbers are enabled, user might suffer from short scanning UPCA or EAN13 into UPCE system number 1 barcodes.

- **Convert to UPCA** : If this parameter is enabled, the UPCE read will be expanded into UPCA, and the following processing will follow the parameters configured for UPCA.
- **System Number Transmission** : If this parameter is enabled, the system number will be included in the data being transmitted.
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

4.6 EAN8

- **Convert to EAN13** : If this parameter is enabled, the EAN8 read will be expanded into EAN13, and the following processing will follow the parameters configured for EAN13.
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

4.7 UPCA

- **Convert to EAN13** : If this parameter is enabled, the UPCA read will be expanded into EAN13, and the following processing will follow the parameters configured for EAN13.
- **System Number Transmission** : If this parameter is enabled, the system number will be included in the data being transmitted.
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

4.8 EAN13

- **ISBN / ISSN Conversion** : If these parameters are enabled, the scanner will convert the code read into ISBN or ISSN code if the formats are correct (EAN13 codes start with 978 or 979 for ISBN, and 977 for ISSN).
- **Checksum Transmission** : If this parameter is enabled, the checksum character will be included in the data being transmitted.

4.9 MSI

- **Checksum Verification** : Three kinds of checksum calculations can be implemented into MSI code : **Single Modulo 10**, **Double Modulo 10**, or **Modulo 11 & 10** checksum. If the checksum character is incorrect, the barcode will not be read.
- **Checksum Transmission** : User can control how the checksum is transmitted by configuring this parameters.
    1) Transmitted
    2) Last digit not transmitted
    3) Last 2 digits not transmitted
- **Code Length Qualification** : Because of the weak structure of the MSI code, a partial scan has a high probability of decoding as a valid but shorter MSI codes (known as short scan). To prevent this kind of undesired readings, the Code Length settings can help to ensure that the correct code is read by qualifying the

allowable code length. Code length limitations can be set in 2 ways : **Fixed Code Length** and **Max / Min code length**. If the fixed code length is selected, up to 2 fixed lengths can be specified. And if max / min code length is selected, the max length and the min length must be specified, and the scanner will only accept those codes with lengths fall between max / min length specified.

4.10 Plessey

- **Convert to UK Plessey** : If this parameter is enabled, the scanner will change each occurrence of the character 'A' into character 'X' in the code.
- **Checksum Transmission** : If this parameter is enabled, the checksum characters (two characters) will be transmitted together with data.

5. Data Output Format

Data read by the scanner will be processed in the following sequence (RS-232 and Keyboard Wedge interfaces only).

1) The character substitution is performed on the barcode data.
2) The Code ID and the Length Code are inserted at the beginning of the data as shown below.

   [Code ID] [Length Code] [Data]

3) The resulting data of step 1 will be processed by the editing formats. For details, please refer to the section "Data Editing".
4) And finally the Prefix Code and the Postfix Code will be added before transmission.

   [Prefix Code] [Resulting Data of Step 3] [Postfix Code]

5.1 Character Substitution

There are three character substitution settings on the scanner. These settings are configured on a character base. That is, a specific character is to be substituted by an another character. The character substitution is performed on every occurrence of the characters specified in these settings. Be aware, the substitution is performed **only** on the barcode itself (exclude Prefix Code, Postfix Code, Code ID, Length Code or any Additional Field) and is performed before editing mode processing.

If only the character to be replaced is specified, every occurrence of that character in the barcode will be taken away.

5.2 Prefix / Postfix Code

Up to four characters of prefix / postfix code can be configured for the scanner.

5.3 Code ID

Up to two characters of Code ID can be configured for each symbology. To minimize the Code ID configuration efforts, the scanner provides five predefined Code ID Sets that user can select from. User can first select one of the Code ID Sets and then

make desired modifications. The pre-defined Code ID Sets are shown below.

	Set 1	Set 2	Set 3	Set 4	Set 5
Code 39	A	C	Y	M	A
Italy Pharmacode	A	C	Y	M	A
French Pharmacode	A	C	Y	M	A
Industrial 25	C	H	H	H	S
Interleave 25	D	I	Z	I	S
Matrix 25	E	G	G	G	S
Codabar	F	N	X	N	F
Code 93	I	L	L	L	G
Code 128	H	K	K	K	C
UPCE	S	E	C	E	E
EAN8	P	B	B	FF	E
EAN13	M	A	A	F	E
MSI	V	V	D	P	M
Plessey	W	W	E	Q	P
UPCA	M	A	A	F	E

5.4 Length Code

Two digits Length Code representing the length of data (character count) can be inserted in front of data being transmitted. This Length Code parameter can be individually enabled or disabled for each barcode symbology.

6. Data Editing

The 1067/1090/1021+ CCD scanner provides advanced data editing functions for data formatting. Data editing is performed according to user configured editing formats. Up to three editing formats can be configured.

Data is divided into fields by user specified rules. These fields together with user configurable additional fields constitute the data actually sent to the host computer. The detailed descriptions and the configuration procedures of the editing format are described in this section.

6.1 Select Editing Format

To start configuring an editing format, the editing format to be configured must first be selected. Once it is selected, the parameters pertaining to editing format (applicable condition, total number of field, field dividing rules, additional fields, and field transmission sequence parameters) can be configured. After all the desired parameters are configured, the "End of Format Programming" label must be read to complete the configuration of that editing format.

Note : Before completing the configuration of the editing format, if parameters other than those pertaining to editing format are read, the editing format under configuration will be aborted. User must restart the configuration again by selecting editing format to be configured.

6.2 Restore Default Format

After the editing format to be configured is selected, user can read the "Restore Default Format" label to put the editing format back to default setting. The default settings of the editing format are listed below.

- Applicable Code Type : All
- Applicable Length : Both max and min length are zero.
- Matching string : Empty
- Matching String Location : 0
- Total number of field : 1
- Field Setting : Not Configured

- Additional Fields : Empty
- Field Transmission Sequence : F1

6.3 Applicable Conditions

Three applicable conditions can be configured to qualify whether the data read by the scanner can be processed by the particular editing format. Data editing will not be performed unless all three applicable conditions are met The configurable applicable conditions are described below.

- **Code Type** : This parameter specifies the code type of the data eligible for data editing. Multiple code types can be specified for this parameter.
- **Data Length** : This parameter specifies the length (character count) of the data eligible for data editing. It is specified in the range format. The length of the data must fall between max and min length limits. If the max length and the min length configured is both zero, the scanner will not perform this length qualification.
- **Matching String and its Location** : User can specify a particular character string (up to four characters) that must appear in the data which is eligible for data editing. User can also specify where (character position, starts from one) this string should appear in the data by configuring the matching string location. If the location specified is zero, the scanner only checks for the existence of the matching string in the data. To disable the matching string qualification, just leave the matching string empty.

6.4 Total Number of Fields

Data can be divided into at most 6 fields. The total number of fields configured must be correctly specified. The fields are numbered from F1 to F6 accordingly, but only F1 to F5 can be configured. Please note that, the number of fields can be configured is always one less than total number of fields specified. The extra data characters beyond the

last field configured will be automatically assigned to the next field. That is, if three fields are configured for the editing format, the data characters after F3 will be assigned to F4 automatically. This feature is quite useful especially when data of variable lengths is processed by editing formats.

6.5 Dividing Data into Fields

Data eligible for editing format is divided into fields according to user specified rules. The rule for each field can be configured in two ways.

- **Field Terminating String** : The field dividing rule can be configured by specifying the field terminating string. The field terminating string configured can be up to two characters. The scanner will search for the occurrence of this particular string in the data for the field. The field terminating string is always included in the field. User though, has the option of discarding this terminating string.
- **Field Length** : The field dividing rule can be configured by simply specifying the field length. The scanner will assign the next specified number of characters into the field.

6.6 Additional Fields

User can create up to five additional fields for each editing format. Each additional field can have at most four characters. The additional fields are numbered AF1 to AF5 accordingly.

6.7 Field Transmission Sequence

After the data fields and the additional fields are configured, user can now program the transmission sequence of these fields that comprise the final data. The “Start” label must be read before assigning the field transmission sequence. And then the desired field transmission sequence can be specified. The scanner will transmit the fields in the order (sequence) user programmed when sending data. The field transmission sequence can be assigned in any desired order and fields can also be assigned multiple times. The maximum number of fields can be assigned

is twelve. After the sequence has been assigned, the "End" label must be read to complete the setting.

6.8 End of Format Programming

After all the desired parameters are configured, the "End of Format Programming" label must be read to conclude the programming of the editing format. This label is located at the bottom of every even page in the "Editing Format Parameters" section of the configuration manual.

6.9 Activate Data Editing Formats

Before data can be processed by a particular editing format, that format must be enabled. The editing formats can be enabled or disabled individually.

6.10 Exclusive Data Editing

If this parameter is enabled, all data read by the scanner must be processed by the editing format. If the data is not eligible for all enabled editing formats, the scanner will not accept the reading and the data will not be transmitted.

6.11 Programming Examples

Example 1 : Extracts data from the 10th character to the 19th character.

Total Number of Fields : 3
Field 1 : Divide field by field length, set field length to 9
Field 2 : Divide field by field length, set field length to 10
Field Transmission Sequence : F2

Example 2 : Extract the date code, item number, and quantity information from barcodes. Data is encoded in the barcode like this : From the first character to the 6th character is the date code. From the 7th character is the item number, its length is not fixed but is delimited by a '-' character. After the '-' character is the quantity information.

Data should be transmitted like this : Item number goes first, then a TAB character, and then the date code, and then another TAB character and finally the quantity.

Total Number of Fields : 3

Field 1 : Divide field by field length, set the field length to 6.

Field 2 : Divide field by field terminating string. Set terminating string to '-', and discard the terminating string.

Additional Field 1 : Set to one TAB character.

Field Transmission Sequence :

F2 AF1 F1 AF1 F3

7. Configuring 1067/1090/1021+

Configuring the 1067/1090/1021+ CCD Scanner is done by reading the setup labels contained in the Configuration Manual (the second part of this manual). This section describes the procedure of configuring the scanner. Some configuration examples are also given in this section for illustration.

7.1 Enter Configuration Mode

To start the configuration, the "**Enter Setup**" label must be read. This will put the scanner in the configuration mode. The scanner will respond with 6 beeps and the indicator will turn green after the label is read. This "Enter Setup" label is located at the bottom of almost every even page of the Configuration Manual.

7.2 Default

All the parameters of the scanner will return to their default values by reading the "Default" label. The scanner will beep twice when the "Default" label is read.

7.3 List Setting

The current setting of all scanner parameters can be sent to the host computer for user inspection. The listing is separated into ten pages. User can select the page of interest by reading the "Page x" label. The scanner can not list setting, if Wand Emulation interface is configured.

Page 1 : Interface, Buzzer, and Scanner Parameters
Page 2 : Prefix, Postfix, and Length Code Setting
Page 3 : Code ID
Page 4 : Readable Symbologies
Page 5 : Symbology Parameters (1/3)
Page 6 : Symbology Parameters (2/3)
Page 7 : Symbology Parameters (3/3)
Page 8 : Editing Format 1
Page 9 : Editing Format 2
Page 10 : Editing Format 3

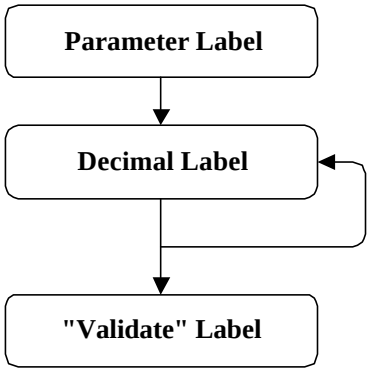
7.4 Setting Parameter Values

For most of the parameters, only one reading is required to set them to new values. The scanner will respond with two beeps when these parameters are configured. But for some special parameters, multiple readings are required to complete the setting. The scanner will respond with a short beep if the configuration of the parameter is still not complete. These parameters usually refer to a numeric value or a string of characters, such as keyboard type, inter-character delay, prefix / postfix code, etc..

For these kinds of parameters, the label of the parameter to be configured must be read first. And then, the labels comprising the numeric value or character string are read. And finally, the "Validate" label must be read to complete the setting. The scanner will respond with two beeps when the "Validate" label is read.

7.4.1 Numeric Parameters

The configuration procedures for numeric parameters are shown below.



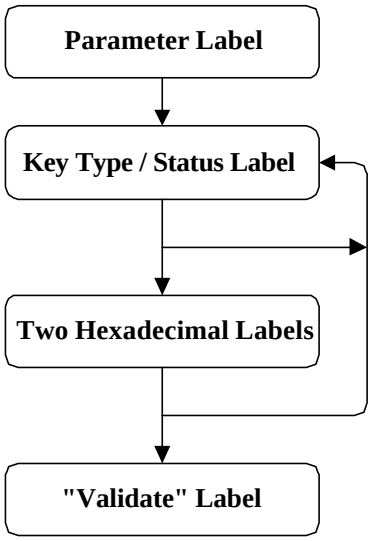
For example, to configure the Inter-Character Delay to be 15 ms, the "Inter-Character Delay" label is first read, and then the decimal digit labels "1" and "5", and finally, the "Validate" label to complete the setting.

7.4.2 Character String Parameters

Basically, each character programmed for the character string parameters is represented by two hexadecimal digits. The two hexadecimal digits usually comprise a value which is the ASCII code equivalence of the character being programmed.

Beside the two hexadecimal digits, there is an optional key type/status can also be specified for each character of the string parameters. This optional key type/status can only be specified for some particular parameters when keyboard interface is used. These parameters are : Prefix Code, Postfix Code, Code ID, and Additional Fields of Editing Formats.

The available key type/status settings can be selected will be described briefly. The configuration procedures for character string parameters are shown below.



For example, to configure the Prefix Code to be “AB”, the “Prefix Code” label is first read, and then the hexadecimal digit labels “4”, “1”, “4”, and “2” are read, and finally, the “Validate” label to complete the setting.

7.4.3 Key Type/Status Setting

The key type/status is specified in character basis. Each character programmed is by default of *Normal* key type. A character of normal key type can have associate status settings (add Shift/Control/Alternate). Whereas a character of *Scan Code* type may not have any associate key status settings.

- **Normal Key Type:** When this label is read, the scanner will assume the following hexadecimal digits are the ASCII code of the character being programmed. And it will also clear all the associate key status settings made to the current character.
- **Scan Code** : When this label is read, the scanner will assume the following hexadecimal digits are the scan code value of the character being programmed.
- **Add Shift** : The Shift key will be sent together with the character programmed.
- **Add Control (L)** : The left Control key will be sent together with the character programmed.
- **Add Alternate (L)** : The left Alternate key will be sent together with the character programmed.
- **Add Control (R)** : The right Control key will be sent together with the character programmed.
- **Add Alternate (R)** : The right Alternate key will be sent together with the character programmed.

For example, to program the Prefix Code to be “Ctrl-Shift-B”, “C”, the programming sequence should be :

1) “Prefix Code” label
2) “Add Control (L)” label
3) “Add Shift” label
4) “4” of the hexadecimal digit
5) “2” of the hexadecimal digit
6) “4” of the hexadecimal digit
7) “3” of the hexadecimal digit
8) “Validate”

Note : In internal representation of the characters which are specified with either scan code or associate key status, occupy two normal character space each. So the maximum number of characters can be configured for a string parameter will decrease, if these character specifications are used.

7.5 Exit Configuration Mode

Both the “Update”, and the “Exit Setup without Changes” labels will exit the scanner from configuration mode when they are read. These two labels differ in whether to keep the new settings on the scanner or not, as their names suggest. The scanner will respond with 6 beeps and restart itself, if either label is read.